Research Paper | Economics | E-ISSN No : 2454-9916 | Volume : 9 | Issue : 4 | April 2023

CLIMATE CHANGE AND SUSTAINABLE AGRICULTURE : A ROAD MAP FOR ENSURING FOOD SECURITY IN INDIA

Dr. Ifsha Khurshid

Assistant Professor, University Department of Economics, Vinoba Bhave University, Hazaribagh

ABSTRACT

There is a massive chaos in nature that is termed as climate change and has been witnessed by nations worldwide in the form of frequent and random instances of cloud bursts, flash floods, flooding, landslides, earthquakes and erratic weather pattern. The brunt of this has to be faced by the whole mankind through major challenges related to food security, crop failure, drought, poor health and quality of life. All these instances are due to mismanaging and overburdening the resources and failing in maintaining the balance between need and greed by man in the process of development. The apparent change in climate is mostly caused by rapid increase in the emission of greenhouse gases in the atmosphere. The whole world is on a trajectory now to find out ways and means to adopt sustainable practices in almost all spheres of life. The most drastic and lethal outcome that the mankind has to face as a challenge will be food crisis and the severity of which will be intensified due to water shortage also. India will have to fight on various fronts, with huge population there lies a massive challenge of meeting the persistent increase in demand for food. On the other hand Indian agriculture is full of constrains like small and fragmented land holdings, poor technology and monsoon dependent farming. The excessive use of chemical fertilizer after green revolution has not only caused soil erosion but also led to depletion in water table and further addition in land, air and water pollution. We are now hit with the dual problem of managing high demand for food along with practicing the organic set up in farming and avoiding further damage to nature. In this study we will try to focus on such sustainable practices which will not only tackle the problem of food security in India but will also deal with sustainable agricultural practices keeping in mind the looming threat of climate change.

KEYWORDS: Climate Change, Sustainable agriculture, food security, water scarcity

INTRODUCTION

Agriculture and its allied sector with 54.6 % (Census 2011) of the total working population involved in it and it also holds an important position in terms of contribution to the country's growth. In the year 2019-20(current prices) the contribution of primary sector was 17.8% of country's GVA in the country. There have been various steps taken by the Government of India for opting for sustainable agricultural development. The primary sector is closely and directly related to nature therefore the understanding on the impact of climate change is really important for adaptation and mitigation strategies that can help farmer to deal with the changing climate. Various Research and technologies are developed by ICAR, DAC and FW , DAHD etc. to promote climate resilience.

There is a need for a holistic approach that will specifically focus on vulnerable regions of the farming sector where various measures like adaptation of best technologies, mitigation and training farmers through financial assistance and capacity building progamme is intensely needed. Identification of the priority areas are to be done to work effectively for minimizing the harsh impact of climate change. In defining the priority areas research and development, technology adoption, infrastructure and capacity building should be taken into consideration so that a multi-dimensional and cross sectoral measures could be adopted.

In order to ensure food-security the research and development work pertaining to soil health is also very important. The land under cultivation has been declining persistently due to rapid industrialization and urbanization. Besides the rampant use of chemical fertilizers after green revolution has also adversely affected the soil health of existing land mass. Therefore it is essential for utilising the remaining land resource judiciously.

The soil and land use survey of India (SLUSI) which was established in 1958 works as an apex organization that deals with land resource mapping and conducting soil survey in the country. It is a sister or subordinate office that comes under INA division, Department of Agriculture and Farmers Welfare.

In India the situation of obtaining food security is challenging and hence the government is concerned to ensure food security for a massive population with horrendous impact on climate change. For this the government has started to concentrate on various policies and programmes. Ministry of Environment, forests and climate change (MoEF&CC) prepares Biennial update Reports (UR's) and National Communication (NAT Com) which is submitted to the secretariat of UNFCCC United Nations Framework Convention on Climate Change, at specific intervals. The report concerned to agriculture is submitted to BUR that included the data of all the activities related to agriculture, such as, micro-irrigation, horticulture, plantation, poultry, fishery, agro-forestry and rice intensification system etc.

The climate change cell works for Natural Resource Management Division, collects te data and input material from the respective implementing divisions and then it is furnished to MoEF& CC to be further included in the GHG Inventory at national level.

The importance of allied sectors (fishery, poultry,agro-forestry and horticulture) of agriculture is gaining momentum as they contain the answers to various challenges and concern faced by India. The looming threat of climate change along with food insecurity is further aggravated with the rapid rise in population. Recently we have surpassed China and have become the most populous country of the world with 141.5 crores of population. This situation is further worsened with enormous decline in the land under cultivation. India is also witnessing a massive transformation is agricultural production and its productivity. The problems like erratic weather, poor soil health, poor irrigation facilities, heavy dependency on monsoon, small and marginal farmers along with divided and fragmented landholdings are making it difficult for agriculture sector to fight on dual front of climate change and food insecurity. Hence the focus should be diverted to other alternatives of food supply to actively fuel the food supply chain and avoid food crisis and hunger in India, which is now the most populous country of the globe.

The allied activities of agriculture needs to be given that required drive as it will not only help us in meeting the challenges of food security but also will enable to earn additional income to farmers. The collaboration of agriculture to the allied activities will not only help in increasing the agricultural productivity but will also enhance the capital formation in primary sector. This diversification is a need of time which should focus on land and water management, farm mechanisation, animal husbandry, fisheries and aquaculture, horticulture and agro-forestry along with other allied activities.

The fisheries and aquaculture are very important sectors that have the ability to work according to the sustainable development goals and to tackle the issues like food security, hungermanagement of inland water ways, unemployment, poverty, biodiversity, economic growth and climate change. It is also a major contributor for earning as this sector is growing with a pace of 5% per annum in India and India has obtained the position of second largest producer of fish after China. The major benefit of this is focussing on food security focusing on nutritional security, livelihood security and export earning makes this sector in boosting the over all economic growth in a sustainable framework. There are various Government sponsored schemes have been working to multiply the export earnings through increased fish production of the country. The problem of food security which is a major concern due to rising population can be shared wisely through this sector. The per capita consumption of fish in India is more than 6 kg per annum.

The other channel of diversification of agriculture is poultry sector which will also play a pivotal role in obtaining food security in India in a sustainable fashion. The poultry sector deals with both production of meat and eggs. Although poultry covers a large range of species of birds which are domesticated for purpose of meat, eggs and feathers but chicken are the most commonly raised bird identified as poultry in India. This business has a huge scope in India as it has the ability to

kick start and earn profit at a low rate of investment. This practice is a source of livelihood and income in both rural and urban areas. Poultry farming mostly utilizes the family labour and most of which are women that also gives an advantage to female folk to be a party of small scale poultry production and to enhance their earning. India stands 3rd in production of eggs and 5th in the production of chicken meat in the world. This emphasises the importance of poultry sector in export earning and makes it competent in battling with the challenges like hunger, food and nutritional security, poverty etc. States like Andhra Pradesh, Gujrat, Haryana, Karnataka, Maharashtra, Punjab, Tamil Nadu and West Bengal are the major contributors to the production of eggs. This sector is extremely important after facing the problem of distress migration occurring due to non-availabilityof land under cultivation. In India approximately 85% of the land holdings are below 2 hectares that means they are small and marginal holdings and with rapid increase in population the stress on land is further causing the division and fragmentation of land holdings. In such a scenario the dependency on land and agriculture is declining and also failing to be the sole source of livelihood income and food security. Maintaining the sustainable means of production under such stressful circumstance would rather be difficult.

In such a scenario the distress rural urban migration in a haphazard manner may cause stress on urban sector too, which will increase the burden on resources causing poor sanitation, poor health, food insecurity and unsustainable modes of survival.

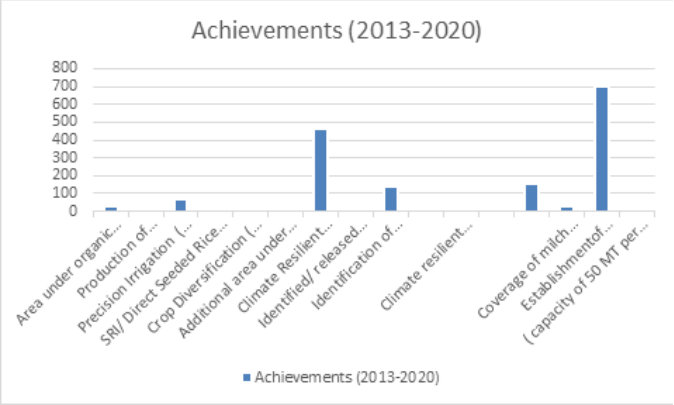
Hence the dependency on the allied sector is essential keeping in mind the present scenario. There are other potential areas in primary sector that will focus on sustainable means of obtaining food security like agro-forestry and horticulture. As we all know that it speaks of judiciously managing the production of agricultural crops along with woody perennials in a given piece of land that would certainly address the requirement of wood and shelter, food nutritional and environmental security.

Besides this sector also has a huge potential for livelihood through green jobs. This sector not only meet the requirement of food but is also supportive in mitigating the effects of climate change through techniques of microclimate moderation and also concentrating in the conservation of natural resources. The National Agro Forestry Policy and The Sub Mission on Agroforestry Policy (SMAF) 2016-17 under NMSA are the initiatives taken by Government of India. These schemes promote " Har Medh Par Ped" along with crops and cropping pattern in the country. These tress helps in increasing the forest cover that will be helpful in carbon sequestration, climate resilience etc. which also works for risk management and enrichment of soil organic matter. The focus is laid on those trees which can give short, medium and long term returns. It helps in earning additional income to farmers and is supportive for the production of fruits medicinal plants, timber, fodder etc.

SN.	Deliverables	Achievements (2013-2020)
1.	Area under organic farming (lakh ha)	31.62
2.	Production of biofertilizers (lakh MT)	7.29
3.	Precision Irrigation (Lakh ha)	64.40
4.	SRI/ Direct Seeded Rice form Transplantation (Lakh ha)	10.965
5.	Crop Diversification (lakh ha)	3.584
6.	Additional area under plantation in arable land (lakh ha)	10.701
7.	Climate Resilient Varieties (CRV) Identified/ released (No.)	467.00
8. (a)	Identification of genotypes of crops with enhanced CO2fixation potential and less water consumption and nutrients (No.)	137.00
(b)	Climate resilient Genotypes with greater adaptation to drought, flood, salinity and high temperature (N0.)	156.00
9.	Coverage of milch animals under ration balancing programme (Lakh No.)	29.581
10.	Establishmentofbybass protein feed making unit (capacity of 50 MT per day (No.)	700

Table : Achievement as reported by implementing programme Division/ Department as on 30th Nov 2020

Incorporating the same in the table we get the following diagram :-



Source : Department of Agriculture, Cooperation and Farmers welfare.

The above mentioned table gives the details of the achievements of Government of India during 2013-2020 after adopting various ways and means to increase the productivity of primary sector through sustainable ways. Despite various check and balance measures adopted by the Government there are further efforts needed to make a persistent move.

After surpassing China in terms of population there is a huge requirement of food and wood which eventually put immense pressure on land and forests in India. Food security accompanied by nutritional security is important and meeting the needs in sustainable fashion is very important. Keeping in mid the looming threat of climate change ignoring which can lead to devastating consequences. We have a rocky road ahead but still we have to learn to harness sustainable ways to grow food. The growing of crops has always been a gruelling task that started generations ago where our ancestor learned to grow food with such arduous ways which never was harmful for our survival. The really basic early farming activities offers so much to learn where the food was produced as per the need not greed. We have turned down from 22 staple food to mere 11 staple food items now.

Farming began after a huge and abrupt change climate after ice age. The temperature rose and fall dramatically even during early days of farming and the agriculture sector holds the responsibility to ensure food security of the population. This sector has been important for not only ensuring food security but for transforming the human society and fuelling the human population that has increased from 4 million to 8 billion in 2022 since 10,000 BCE.

In the present scenario farming is not smooth as there are various constraints that's adding up to the bottleneck of production. The massive degradation is soil, rapid increase in population, multiplied emergence of pests and diseases, climate changes are among the several other factors that has crippled the agricultural growth. These are the few challenges that our ancestors faced when they started farming. Now the time has come where we have to revise the lesson learnt hard and repeat the sustainable practices of sustainable agriculture in the past. Adopting indigenous techniques and behaviour we may be able to understand the value of nature and difference between our need and greed.

The temperature is rising rapidly and now it's staying the same way affecting the agriculture. The warmer climate and increased CO2,which was considered good for plant production after ice age is now becoming a threat to human existence and food production. The demand for food has also increased rapidly due to rapid increase in population globally and specifically in India.

The growing body of agricultural sector has also consumed more and more of capital energy and resources. The number of staple food which was 22 that included wild plant based foods, fungi etc. dropped down to mere 10-11 today.

There has been a change in food pattern time to time considering managing the balance of demand and supply of food. The change in climate, population and technology has always played a vital role in being a decisive factor in ensuring food security. Agriculture has always been and will remain the driving force in the growth of various civilization and to ensure the existence of civilizations across world. As stable farming led to stable food supply and that diversified the role of human resource and channelized their efficiency in other fields that acts as a major source for national development, but if ever this agricultural productivity has to compete with rising demand of increased population there are severe outcomes in the form of resource degradation, climate change, flood, drought and famines.

Hence the cycle of growth is needed to be balanced which will not only

increase the agricultural production but also the distribution of the produce which is much needed to ensure food security in India. At present we are experiencing a very fragile global food system that is yet to witness the worst food crisis ever. The prices of food will be at its peak and the problem of hunger would be at rise. Therefore, we should collectively focus to work on various sustainable measures to ensure food security among one of the most populous nations of the world that is India.

REFERENCES

1. Abdu J. M . Kahssay and M. Gebremedhin (2018). ' Household Food Insecurity, Underweight Status, and Associated Characteristics among Women of Reproductive Age Group in Assayita District, Afar Regional State, Ethiopia, ' Journal of Environmental and Public Health 7659204. https:// doi.org/ 10.1155/2018/ 759204
2. Andersson Djurfeldt, A. And S. Wambugu (2011). ' In-kind Transfers of Maize, Commercialization and Household Consumption in Kenya', Journal of Eastern African Studies 5 : 447-4.
3. Chand, Ramesh (2007). ' Demand for Foodgrains' . Economic and Political Weekly 42 (52), December 29- January 4.
4. Chandrasekhar, C.P., Jayati Ghosh and Anamitra Roy chowdhury (2006). ' The Demogaphic Dividend and Young India's Economic Future, ' Economic and Political Week141 (49). December 9-15.
5. De Muro, P. And f. Burchi (2007). Education for Rural People : A Neglected Key to Food security, Department of Economics, University Roma Tre.
6. Gundersen C.S Garasky and B.J Lohman (2009), ' Food Insecurity is Not Associated with Childhood Obesity as Assessed using Multiple Measures of Obesity', The Journal of Nutrition 139 (6) : 1173-78, doi : 10.3945/jn.109.105361.
7. Government of India (2018). SDG, India Index, Baseline Report 2018. NITI Aayog, Government of India.
8. Government of India (2019-20) , SDG, India Index and Dashboard, 2019-20. NITI Aayog, Government of India.
9. Government of India (2020). All India Report on Agriculture Census 2015-16. Ministry of Agriculture and Farmers Welfare, New Delhi, Government of India. Downloaded from https://agcensus.nicin/document/agcen151/ac_1516_report_final-220221pdf.
10. Ramchandran, P.(2013). ' Food & Nutrition Security : Challenges in the New Millenium', Indian Journal of Medical Research 138: 373-82
11. Sharma, Pooja and Ashok Gulati (2012). ' Approaches to Food Security in Brazil, China, India, Malaysia, Mexico and Nigeria : Lessons for Developing Countries', ICRIER Policy Series No. 14.
12. UNICEF (2007). Te State of the World's Children. 2008: Child Survival. New York : UNICEF